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Titanium Ti-6Al-4V (Grade 5), Annealed Bar

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Subcategory: Alpha/Beta Titanium Alloy; Metal; Nonferrous Metal; Titanium Alloy

Close Analogs: 4 other heat treatments of this alloy are listed in MatWeb.

Key Words: Ti-6-4; UNS R65400; ASTM Grade 5 titanium; UNS R56401 (ELI); Ti6Al4V, biomaterials, biomedical implants, biocompatibility

Component	Wt. %
Al	6
Fe	Max 0.25
O	Max 0.2
Ti	90
V	4

Material Notes:
Information provided by Allvac and the references. Annealing Temperature 700-785ºC. Alpha-Beta Alloy

Applications: Blades, discs, rings, airframe, fasteners, components. Vessels, cases, hubs, forgings.. Biomedical implants.

Biocompatibility: Excellent, especially when direct contact with tissue or bone is required. Ti-6Al-4V's poor shear strength makes it undesirable for bone screws or plates. It also has poor surface wear properties and tends to seize when in sliding contact with itself and other metals. Surface treatments such as nitriding and oxidizing can improve the surface wear properties.

Click here to view available vendors for this material.

Physical Properties	Metric	English	Comments
Density	4.43 g/cc	0.16 lb/in³	
Mechanical Properties			
Hardness, Brinell	334	334	Estimated from Rockwell C.
Hardness, Knoop	363	363	Estimated from Rockwell C.
Hardness, Rockwell C	36	36	
Hardness, Vickers	349	349	Estimated from Rockwell C.

Tensile Strength, Ultimate	900 MPa	131000 psi	
Tensile Strength, Yield	830 MPa	120000 psi	
Elongation @ break	10 %	10 %	
Reduction of Area	33 %	33 %	
Modulus of Elasticity	114 GPa	16500 ksi	Average of tension and compression
Compressive Yield Strength	860 MPa	125000 psi	
Poisson's Ratio	0.33	0.33	
Fatigue Strength	510 MPa	74000 psi	Smooth, 10,000,000 Cycles
Shear Modulus	44 GPa	6380 ksi	

Electrical Properties

Electrical Resistivity	0.000178 ohm-cm	0.000178 ohm-cm	
Magnetic Permeability	1.00005	1.00005	at 1.6 kA/m
Magnetic Susceptibility	0.0000033	0.0000033	cgs/g

Thermal Properties

CTE, linear 20°C	8.6 µm/m-°C	4.78 µin/in-°F	20-100ºC
CTE, linear 250°C	9.2 µm/m-°C	5.11 µin/in-°F	Average over the range 20-315ºC
CTE, linear 500°C	9.7 µm/m-°C	5.39 µin/in-°F	Average over the range 20-650ºC
Heat Capacity	0.5263 J/g-°C	0.126 BTU/lb-°F	
Thermal Conductivity	6.7 W/m-K	46.5 BTU-in/hr-ft²-°F	
Melting Point	Max 1660 °C	Max 3020 °F	Liquidus
Solidus	1604 °C	2920 °F	
Liquidus	1660 °C	3020 °F	
Beta Transus	980 °C	1800 °F	

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References for this datasheet.

Some of the values displayed above may have been converted from their original units and/or rounded in order to display the information in a consistant format. Users requiring more precise data for scientific or engineering calculations can click on the property value to see the original value as well as raw conversions to equivalent units. We advise that you only use the original value or one of its raw conversions in your calculations to minimize rounding error. We also ask that you refer to Matweb's disclaimer and terms of use regarding this information. Click here to view all the property values for this datasheet as they were originally entered into Matweb.